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Smart Farming through IoT Enabled Tools

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Abstract

Agriculture plays an important role within the growth and development of the planet. By the year 2050 world population is predicted to hit several 960 million. It'll be needed to provide double the amount of food than currently being made. To fulfil the human needs, it'll be needed to revolutionize a replacement agricultural era by introducing advanced technologies to the sphere and delivery them on a similar platform by victimization fashionable digital technologies. Agriculture is that the backbone of each country and economy. Smart Farming through IoT technology may empower farmers to upgrade gain going from the amount of manure to be accustomed quantity of water for irrigating their fields and additionally facilitate them to decrease wastage. And by using Artificial Intelligence [AI] sensors technology worldwide which helps yield healthier crops, track soil, manage pests, growing conditions, coordinate farmer's data, help with the workload, and advance a wide range of agricultural tasks across the entire food supply chain.

Keywords: Smart farming, Artificial intelligence, Sensor.

1 | Introduction



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Agriculture plays an important role within the growth and development of the planet. By the year 2050 world population is predicted to hit several 960 cores [1], [2]. It'll be needed to provide double the amount of food than currently being made. To fulfil the human needs, it'll be needed to revolutionize a replacement agricultural era by introducing advanced technologies to the sphere and delivery them on a similar platform by victimization fashionable digital technologies [3], [4]. Agriculture is that the backbone of each country and economy [5], [6]. This helps farmers shield and monitor their property remotely, etc. Internet of things (IoT)-based good sensors is the new technique for the good agriculture system [7], [8]. IoT-based good agriculture system consists of assorted sensor nodes placed in numerous locations, web service, smart remote devices, or laptop systems with the web that monitor the operation of device nodes, WiFi, a camera with a microcontroller, and different interfacing sensing nodes for service [9], [10]. A number of the samples of such sensors area unit temperature sensors for temperature sensing, soil wet sensors to envision the wet content within the soil, PIR sensors utilized in the detection of animals, individuals and



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alternative objects gift within the farm field, GPS-based remote control robots that perform spraying, weeding, security, wet sensing, etc. [11], [12].

2 | Literature Review

IoT in farming is used to improve time efficiency, irrigation, crop monitoring, and reduce the usage of insecticides and pesticides due to early detection of disease etc. It also to reduce labour work and streamlines the farming. IoT in farming is used to collect data on temperature, humidity, wind speed, and soil fertility in real time [13], [14]. These data are used to automate the farming, minimize labour requirement and reduces difficulty required to monitor the crops [15], [16].

Smart Irrigation System: The integration of WSN and fuzzy logic system has an advantage in improved saving water and provides accurate suggestion to the farmers [17], [18].

Smart Insect and Pest Detection: Excessive use of pesticides for crop to removal of pest will increase the danger to human beings and environment we can avoid this by using Pest Detection [19], [20].

Crop Selection: The system uses IoT and machine learning algorithm to predict suitable crop for particular land based on climatic factors such as temperature, humidity, soil moisture, soil nutrient content such as nitrogen, phosphorus, potassium [21], [22].

The system is designed as an android application, in which user has to feed their inputs to get the necessary information. Artificial neural network is used for modelling that help in prediction and it is implemented using feed forward back propagation network. This paper suggest farmer a suitable crop for their land and also help in suggesting the fertilizer and also suggest whether the farmer chosen crop will provide high yielding or not [23].

3 | Proposed Work

Smart agriculture is a broad term that collects data on food production practices powered by IoTs, big data and advanced analytics technology. When we talk about IoT, we generally refer to adding sensing, automation and analytics technology to modern agricultural processes [13]. There's a wide range of IoT sensors used in agriculture, including soil, humidity, moisture, light, air temperature, CO₂, solar energy sensor, and many others. Installed throughout the fields, in the IoT-based monitoring systems, on smart agriculture vehicles and weather stations, sensors continuously collect data and bring visibility and control into agriculture operations [14].

The combination of data coming from diverse sensors allows farmers to build crop models and predict how crops will grow in the given conditions, integrate precision farming practices, create harvesting strategies, etc. We use sensors like, location sensor, optical sensor, electrochemical sensors, mechanical sensors, dielectric soil moisture sensors, airflow sensors [15].

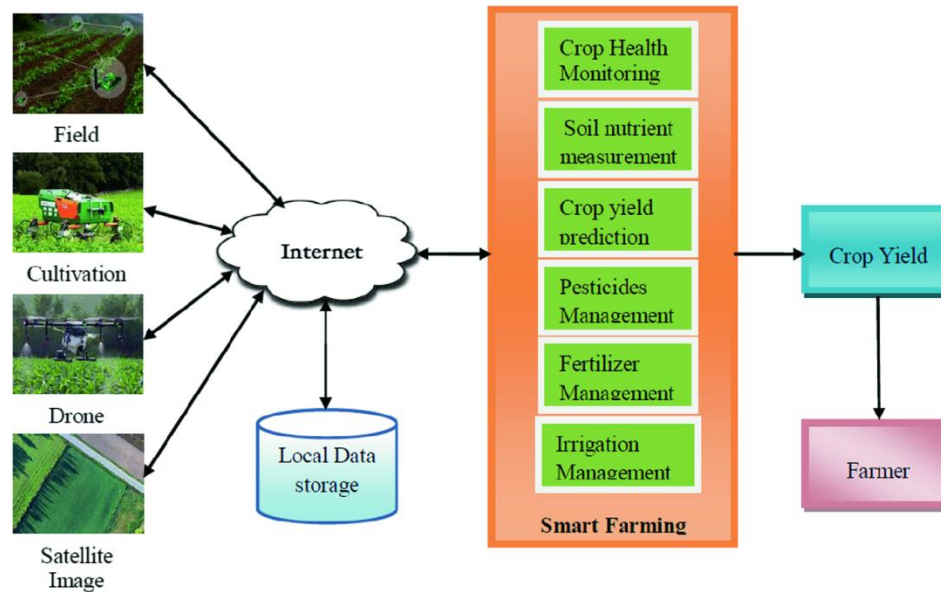


Fig. 1. Proposed Blueprint for Smart agriculture.

4 | Conclusion

Issues regarding agriculture, rural area, and farmers have been always deterring India's growth. Agricultural modernization is the only solution to these three problems. Still, India's agriculture is far away from modernization [16]. The use of IoT in agricultural modernization will possibly solve the problems. Based on features of IoT and cloud computing, cloud service, SOA (service-oriented architecture) and visualization technologies can generate huge data involved in agricultural production [17]. RFID with IoT technologies can help to build plant factory that can control agricultural production automatically. A perfect use of modern technology and IoT and blend of them can stimulate the rapid development in the modernization of agricultural system. Use of smart IoT in agriculture could effectually solve the issues concerning farmers, agriculture, and rural area [18].

IoT have a major role in developing smart farming that increases the production of agriculture products by monitoring different factors such as temperature, humidity, soil moisture, soil fertility which are important in the growth and production of crops. Smart farming increases the income of farmers by increase the production reduces labour requirement, wastage of water, suggest required amount of fertilizer. In this paper a survey on technologies along with IoT in Smart farming. Smart agriculture technology based on the IoT technologies has many advantages related to all agricultural processes and practices in real-time, which include irrigation and plant protection, improving product quality, fertilization process control, and disease prediction, etc. The advantages of smart agriculture can be summarized as follows:

- I. Increasing the amount of real-time data on the crop.
- II. Remote monitoring and controlling of farmers.
- III. Controlling water and other natural resources.
- IV. Improving livestock management.
- V. Accurate evaluation of soil and crops.
- VI. Improving agricultural production.

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